CLAIMS

WHAT IS CLAIMED IS:

1. An ultra-wideband communication system for a wire medium, comprising:

an ultra-wideband transmitter structured to transmit a training set of ultra-wideband pulses through the wire medium; and

an ultra-wideband receiver structured to receive the training set of ultra-wideband pulses from the wire medium.

2. The ultra-wideband communication system of claim 1, wherein each of the ultra-wideband pulses comprising the training set comprise a pulse of electromagnetic energy having a duration that can range from about 10 picoseconds to about 10 milliseconds.

3. The ultra-wideband communication system of claim 1, wherein each of the ultra-wideband pulses comprising the training set comprise a pulse of electromagnetic energy having a duration that can range from about 10 picoseconds to about 10 milliseconds and a power that can range from about +30 power decibels to about –60 power decibels, as measured at a single radio frequency.

4. The ultra-wideband communication system of claim 1, wherein the training set of ultra-wideband pulses comprises at least one ultra-wideband pulse selected from a group consisting of: a pre-distorted pulse, a pre-emphasized pulse, a shaped pulse, a substantially triangular pulse, a substantially square pulse, a pulse occupying a portion of

a radio frequency spectrum, with a segment of the occupied radio frequency spectrum substantially eliminated; and a pulse occupying a portion of a radio frequency spectrum, with a segment of the occupied radio frequency spectrum amplified.

5. The ultra-wideband communication system of claim 1, wherein the ultra-wideband transmitter comprises an ultra-wideband pulse modulator that is structured to transmit a multiplicity of ultra-wideband pulses.

6. The ultra-wideband communication system of claim 1, wherein the ultra-wideband receiver comprises an ultra-wideband pulse demodulator that is structured to receive a multiplicity of ultra-wideband pulses.

7. The ultra-wideband communication system of claim 1, wherein the wire medium is selected from a group consisting of: an optical fiber ribbon, a fiber optic cable, a single mode fiber optic cable, a multi-mode fiber optic cable, a twisted pair wire, an unshielded twisted pair wire, a plenum wire, a PVC wire, a coaxial cable, and an electrically conductive material.

8. The ultra-wideband communication system of claim 1, wherein the wire medium is selected from a group consisting of: a power line, an optical network, a cable television network, a community antenna television network, a community access television network, a hybrid fiber coax system network, a public switched telephone network, a wide area network, a local area network, a metropolitan area network, a TCP/IP network,

a dial-up network, a switched network, a dedicated network, a nonswitched network, a public network and a private network.

9. The ultra-wideband communication system of claim 1, wherein the ultra-wideband receiver contains information about the training set, and after receiving the training set, responds to the ultra-wideband transmitter with information relating to which of the ultra-wideband pulses in the training set was received in a form that is most similar to a transmitted form.

10. A method of optimizing ultra-wideband communications through a wire medium, the method comprising the steps of:

transmitting a training set of ultra-wideband pulses through the wire medium, the training set of ultra-wideband pulses comprising at least one ultra-wideband pulse;

receiving the training set of ultra-wideband pulses from the wire medium; and

determining which of the ultra-wideband pulses in the training set was received in a form that is most similar to a transmitted form.

11. The method of claim 10, wherein the step of determining which of the ultra-wideband pulses in the training set was received in the form that is most similar to the transmitted form is selected from a group of steps selected from:

correlating each of the received ultra-wideband pulses with a corresponding pulse template, and determining which of the transmitted ultra-wideband pulses most closely matches its corresponding pulse template;

calculating a received signal strength indicator for each of the transmitted ultra-

wideband pulses, and selecting the pulse having a highest received signal strength indicator; and

determining a radio frequency content for each of the transmitted ultra-wideband pulses, and selecting the pulse having a received radio frequency content that is most similar to a transmitted radio frequency content.

12. The method of claim 10, wherein the wire medium is selected from a group consisting of: a power line, an optical network, a cable television network, a community antenna television network, a community access television network, and a hybrid fiber coax system.

13. The method of claim 10, wherein the wire medium is selected from a group consisting of: an optical fiber ribbon, a fiber optic cable, a single mode fiber optic cable, a multi-mode fiber optic cable, a twisted pair wire, an unshielded twisted pair wire, a plenum wire, a PVC wire, a coaxial cable, and an electrically conductive material.

14. The method of claim 10, wherein the at least ultra-wideband pulse comprises a pulse of electromagnetic energy having a duration that can range from about 10 picoseconds to about 10 milliseconds.

15. The method of claim 10, wherein the at least ultra-wideband pulse comprises a pulse of electromagnetic energy having a duration that can range from about 10 picoseconds to about 10 milliseconds and a power that can range from about +30 power decibels to about –60 power decibels, as measured at a single frequency.

16. The method of claim 10, wherein the training set of ultra-wideband pulses comprises at least one ultra-wideband pulse selected from a group consisting of: a pre-distorted pulse, a pre-emphasized pulse, a shaped pulse, a substantially triangular pulse, a substantially square pulse, a pulse occupying a portion of a radio frequency spectrum, with a segment of the occupied radio frequency spectrum substantially eliminated; and a pulse occupying a portion of a radio frequency spectrum, with a segment of the occupied radio frequency spectrum amplified.

17. A method of optimizing ultra-wideband communications through a wire medium, the method comprising the steps of:

transmitting a data set of ultra-wideband pulses through the wire medium, the data set of ultra-wideband pulses comprising a group of bits; and

receiving the data set of ultra-wideband pulses from the wire medium; and

determining a data set bit-error-rate.

18. The method of claim 17, further including the step of adjusting an ultra-wideband pulse recurrence frequency relative to the data set bit-error-rate.

19. The method of claim 17, wherein the data set bit-error-rate comprises a percentage of bits that have an error relative to a total number of received bits.

20. The method of claim 17, wherein the wire medium is selected from a group

consisting of: an optical fiber ribbon, a fiber optic cable, a single mode fiber optic cable, a multi-mode fiber optic cable, a twisted pair wire, an unshielded twisted pair wire, a plenum wire, a PVC wire, a coaxial cable, and an electrically conductive material.

21. The method of claim 17, wherein the wire medium is selected from a group consisting of: a power line, an optical network, a cable television network, a community antenna television network, a community access television network, a hybrid fiber coax system network, a public switched telephone network, a wide area network, a local area network, a metropolitan area network, a TCP/IP network, a dial-up network, a switched network, a dedicated network, a nonswitched network, a public network and a private network.

22. The method of claim 17, further including a step selected from a group consisting of:

correlating each of the received ultra-wideband pulses with a corresponding pulse template, and determining which of the transmitted ultra-wideband pulses most closely matches its corresponding pulse template;

calculating a received signal strength indicator for each of the transmitted ultra-wideband pulses, and selecting the pulse having a highest received signal strength indicator; and

determining a radio frequency content for each of the transmitted ultra-wideband pulses, and selecting the pulse having a received radio frequency content that is most similar to a transmitted radio frequency content.

23. The method of claim 17, wherein each of the ultra-wideband pulses comprises a pulse of electromagnetic energy having a duration that can range from about 10 picoseconds to about 10 milliseconds.

24. The method of claim 17, wherein each of the ultra-wideband pulses comprises a pulse of electromagnetic energy having a duration that can range from about 10 picoseconds to about 10 milliseconds and a power that can range from about +30 power decibels to about –60 power decibels, as measured at a single frequency.